

# Lunar Flywheel weekly meeting- Minutes

## Wednesday; October 19, 2016; 3:30pm

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Present: Dr. Herb Hess, Dr. Feng Li, Justin Pettingill, David Arnett, Nick Bachus, Matt Phillips, Kyle Petersen, Cooper Atkinson, Ian Tanimoto, Brian Cartwright, Shea Morrison

Absent: Andrew Jones (interview)

Late: None

GJ 218 Conference Room

Moderator: Matt Philips

Minutes: Cooper Atkinson

Updates:

- Stator Design Team:
  - Electrical Team
    - Toroid testing (Round1) is complete
      - Reference testing verified that testing method was proper
      - Instruments of insufficient accuracy to properly measure permeability of composites since it is so close to free space.
    - Going forward, look for other testing options/devices to obtain more accurate values
    - These values will be useful in figuring out the magnetic losses in the rotor
    - Justin is exploring powder composites that may work better than our current formula.
      - Maximize amount of iron powder in the composite
    - FEMM software may potentially be used for electrical FEA
  - Mechanical Team
    - Composite tensile testing complete
    - Experimental procedure is in progress
      - Is there a specific format for the procedure?
    - Data analysis will be done in conjunction with a class projects
    - Dr. Bob Stephens meeting
      - Gave direction to what fatigue models should be used
      - Gave some resources to check for reversed torsional fatigue.
      - What would we consider “long life”
      - Factor of safety to be based on life and should be about 2-3

- Controls Team:
  - No hardware updates – Andrew has had other commitments
  - Downloading and looking at the control suite
  - Reading documentation about available libraries
  - More info on microcontrollers coming next week

Update from mentors (Justin and David):

- Justin
  - Test results for composites complete
    - Results make sense – sent to major professor for review
      - May need some additional points
    - Strengths sufficient for flywheel – all
  - Going forward, optimize the mixture more for the electrical properties, since the mechanical properties were more than sufficient for all mixtures tested.
- David
  - Microcontrollers – Delfino 335 and 77D
    - Only have one spare of each, looking at buying more
      - 335=\$65 each
      - 77D-discontinued - now the 790
      - 790 has extra features that could be useful (\$219 per kit)
        - Or \$169 for just the control card
    - Power supply hasn't been specified, but power electronics wanted 80 MHz frequency with operational region of 12-44 volts
      - Target for power supply
      - Need to find the previous power electronics...
        - H-bridge rectifiers (drive current through the coils)
    - Appeared as though hysteresis control was attempted for implementation

Update from weekly Tuesday Meeting with Dr. Berven

- Material discussed at the meeting has already been covered in the discussion above.
  - NASA conference room in BEL

Other Updates:

- Need to complete task report for Dr. Berven meeting prior to COB Monday

Senior Design Items:

- Wiki page lecture Tuesday (3:30 in GJ 114)
- November 4<sup>th</sup> the first wiki page draft is due.
- Design Review is the two weeks before Thanksgiving. Need to choose a date early to make sure we get a good time. (MUST BE DONE BEFORE FRIDAY, NOVEMBER 18<sup>TH</sup>)

